REMARKS

Applicant concurrently files a Request for Continued Examination and the appropriate fees herewith.

Claims 1-13 and 15-19 are all of the claims presently pending in the application. Applicant has canceled claim 14 without prejudice or disclaimer. Applicant has amended claims 1, 2, 4, 5, 7, 11, 13, and 16 to more particularly define the claimed invention.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

As recited in the amended claims 1, 7 and 11, "the intermediate layer comprises a substantially constant hole concentration in a thickness direction thereof."

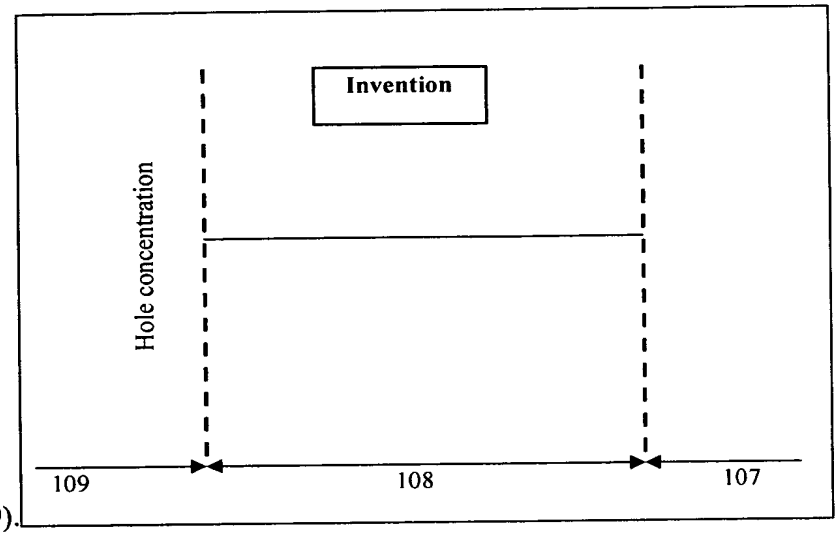
The intermediate layer before doping a donor (Si) has an acceptor (Mg) concentration distribution in the thickness direction thereof as shown in FIG.2 (US 2006/0097283A1 (which corresponds to the Application) at paragraph 0053). The acceptor (Mg) concentration distribution is caused by technical reasons although the acceptor is not intentionally doped (US 2006/0097283A1 at paragraph 0036). As shown in FIG.2, the acceptor (Mg) concentration distribution in the thickness direction of the intermediate layer can be measured such that the concentration of Mg in the intermediate layer (108) lowers from the first p-layer (107) to the second p-layer (109) (i.e., declined distribution).

Here, in the invention, it is considered that the activation rate (hole concentration/acceptor concentration when excited at room temperature) of the acceptor (Mg)

doped is approximately one tenth of that (electron concentration/donor concentration when excited at room temperature) of donor (Si) doped (US 2006/0097283A1 at paragraph 0053). For example, when the acceptor is included ten times the donor at a region in the intermediate layer, the hole concentration can be almost compensated by the electron concentration at the region.

Thus, in consideration of the measured acceptor (Mg) concentration distribution, the donor (Si) is doped in a concentration distribution to compensate the hole concentration (US 2006/0097283A1 at paragraph 0038). For example, as shown in FIG.2, the acceptor (Mg) concentration at the boundary with the first p-layer (107) of the intermediate layer (108) is about $1 \times 10^{19}/cm^3$ and the donor (Si) concentration doped is about $1 \times 10^{18}/cm^3$, i.e., one tenth of the acceptor concentration. On the other hand, as shown in FIG.2, the acceptor (Mg) concentration at the boundary with the second p-layer (109) of the intermediate layer (108) is about $3 \times 10^{18}/cm^3$ and the donor (Si) concentration doped is about $3 \times 10^{17}/cm^3$, i.e., one tenth of the acceptor concentration. Thus, the hole concentration is rendered nearly equal to the donor concentration at all regions in the thickness direction of the intermediate layer.

As a result, the hole concentration in the intermediate layer (108) must be compensated at all regions in the thickness direction of the intermediate layer such that it is substantially constant (as shown below) in the thickness direction between both boundaries with the first p-layer (107) and the second p-layer



(109).

As recited in the amended claims 1, 7 and 11, "the intermediate layer comprises a substantially constant hole concentration in a thickness direction thereof" (e.g., see US 2006/0097283A1 at paragraph 0053 and FIG.2).

The invention as claimed has the feature that "the intermediate layer comprises a substantially constant hole concentration in a thickness direction thereof."

Therefore, the group III-nitride-based compound semiconductor device of the invention shows an improved electrostatic withstand voltage, compared with the one in which the intermediate layer 108 is not formed. Also, the group III-nitride-based compound semiconductor device can have a thinner intermediate layer, compared with the one in which the intermediate layer 108 is not doped with silicon, and therefore it is possible to reduce the driving voltage as well as to improve the electrostatic withstand voltage (US 2006/0097283A1 at paragraph 0054).

Yamamoto fails to teach or suggest the above feature of the invention. An

intermediate layer (34) alleged by the Examiner cannot have its hole concentration compensated at all regions in the thickness direction of the intermediate layer since the donor (Si) concentration distribution is quite different from the acceptor (Mg) concentration distribution in the thickness direction of the intermediate layer before doping the donor (Si) as shown in FIG.2 of Application (See FIG.2Bof Yamamoto).

Fukuda also fails to teach or suggest the above feature of the invention. The Examiner alleges that intermediate layers (11b) are doped at silicon dopant concentration of $1 \times 10^{17}/cm^3$ while intermediate layers (11a) alleged by the Examiner are doped at Mg dopant concentration of $1 \times 10^{18}/cm^3$ (translation paragraphs 0010-0015).

However, since the intermediate layers (11b) are only doped at a constant (not in the declined distribution as mentioned earlier) silicon dopant concentration such as $1 \times 10^{17}/cm^3$, the donor (Si) concentration distribution of Fukuda is also quite different from the acceptor (Mg) concentration distribution in the thickness direction of the intermediate layer before doping the donor (Si) as shown in FIG.2 of Application.

For example, Embodiment 1 of Fukuda is made such that the GaN layer (11b) is doped with silicon at a doping amount of $5 \times 10^{18}/cm^3$ (Fukuda at paragraph 0022). Embodiment 2 of Fukuda is made such that the GaN layer (11b) is doped with silicon at a doping amount of 0 to $1.5 \times 10^{19}/cm^3$ (Fukuda at paragraph 0025). However, Embodiment 2 has four samples and thus each of the four samples is only doped at a constant (not in the declined distribution as mentioned earlier) silicon dopant concentration. Therefore, the donor (Si) concentration distribution of Fukuda is also quite different from the acceptor (Mg) concentration distribution in the thickness direction of the intermediate layer before doping the donor (Si) as shown in FIG.2 of Application.

In view of the foregoing, Applicant submit that claims 1-13 and 15-19, all of the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. Applicant respectfully requests the Examiner to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, Applicant requests the Examiner to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The undersigned authorizes the Commissioner to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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